**In the name of Allah the most merciful and Beneficent.**

**Chapter #1. Introduction to Statistics**

**Statistics:** Statistics is the set of systematically collected information from any field of life

**System:** The process, through which we complete our work, means the proper channel of completing the work. Following are steps of this system.

1. **Data collection**
2. **Tabulation**
3. **Analysis**
4. **Interpretation**

**Data collection:** the process through we collect data is called data collection

**Data:** the collection of different observations is called data. There are two types of data

* **Primary data**
* **Secondary data**

**Primary data:** the first hand collection of data by any person without any arrangement is called primary data. Its also called as Raw data.

**Sources of primary data:**

* Personal investigation
* Through investigators
* Through Questionnaires
* Through local sources
* Through telephone or internet

**Secondary data:** when we arrange the primary data by any statistical tools then it is called secondary data.

**Sources of secondary data:**

* By Government organization
* Semi Government organization
* Publication & research organization
* News paper & internet

**Tabulation:** arrangement of data in tables and graphs and charts.

**Analysis:** applying any statistical rule or formula on data to get results.

**Interpretation:** after completing the whole process explain the results is called interpretation.

**Fields of Life:**

We apply statistics in any field of life.

 **Agriculture:** we use different Fertilizers on different lands this is done with the help of Design of Experiment.

**Economy:** we read the economy of any country this is done with the help of Econometrics.

**Medical science:** we read the cause and effect of different medicines with the help of statistics.

**Branches of statistics:**

1. Descriptive statistics
2. Inferential statistics
3. Theoretical statistics
4. Applied statics

**Q1:** What is meant by Descriptive Statistics?

**A**: Definition of statistics

**Q2:** What is inferential statistics?

**A:** It is the branch of statistics in which we gain information from sample observations & estimate the population parameters.

**Q3:** Define the term Population?

**A:**Tthe total no. of observation of anything which is under study is called population. The popn size is denoted by **N**. example popn of student in a college.

**Q4:** Define sample?

**A:** Any representative part of popn is called sample. The subset of popn is called sample. It is usually selected at random. A good sample is possibly small & shows all the properties of that popn. It is denoted by “n”.

**Q5:** Difference between Parameter and Statistics?

**A:** Parameter:

* The numerical value which is obtained from popn is called Parameters.
* It is always a constant value µ,σ2,P

Statistics:

* The result which is obtained from sample observation is called statistic.
* It is always a variable quantity$\overbar{x}$, S2,p.

**Q5:** What is constant?

**A:** The value which does not change and remain same from every person is called constant. eg days of week, no. of players in cricket team

**Q6:** Define variable?

**A:** A value which does not remain same and its varies from person to person is called variable. Eg . Height of student, weight of student, salary of persons etc

Type of variable:

* Qualitative variable
* Quantitative variable

**Q7:** Define qualitative variable?

**A:** The variable which cannot be measured numerically is called qualitative variable. For this the data is divide into different categories and each observation is belong to one of these eg. Religion, education, nationality, sex etc etc. the qualitative variable is also called Categorical variable.

 **Q8:** Define quantitative variable?

**A:** The variable which can be measured numerically is called quantitative variable. It is either obtained by counting or measuring.

**Q9:** Define Discrete variable?

**A:** The variable which is obtained just by counting is called discrete variable. It is always a whole no. and contains a finite set of values eg. No. of family members, no. of lines on page

**Q10:** Define continuous variable?

**A:** The variable which is obtained by some measurements is called continuous variable. It can assume every possible and infinite set of values in a given range eg. IQ level, color complexion etc.

**Q11:** Define attributes?

**A:** The qualitative observations which cannot be measured but can only be described are called attributes. Beauty, honesty, etc

 **Q12:** What is meant by Ratio?

**A:** The comparison of one number to another having same units is called Ratio.

If a & b are two numbers than Ratio b/w these is denoted by **a: b** or **a/b.**

**Q13:** What is meant by Proportion?

**A:** Proportion is a ratio b/w favorable cases to the total cases eg If there are 30 students in a class from which 10 are girls than

Proportion of girls = 10/30 = 1/3

**Q14:** What is meant by Random error?

**A:** It is the difference between any observations to population parameter. It is the chance variation & is denoted by **ϵi** epsilon also **Σϵi = 0** if yi is any observation & µ is parameter than

**ϵi=** yi - µ.

**Σ:** it is a Greek latter used to denote the summation of number. For example the sum of y1,y2,y3………yn is written as y1+y2+y3+………+yn= Σy.